Multi-Sensor Ocean Colour Atmospheric Correction for Time-Series Data: Using all the informational available

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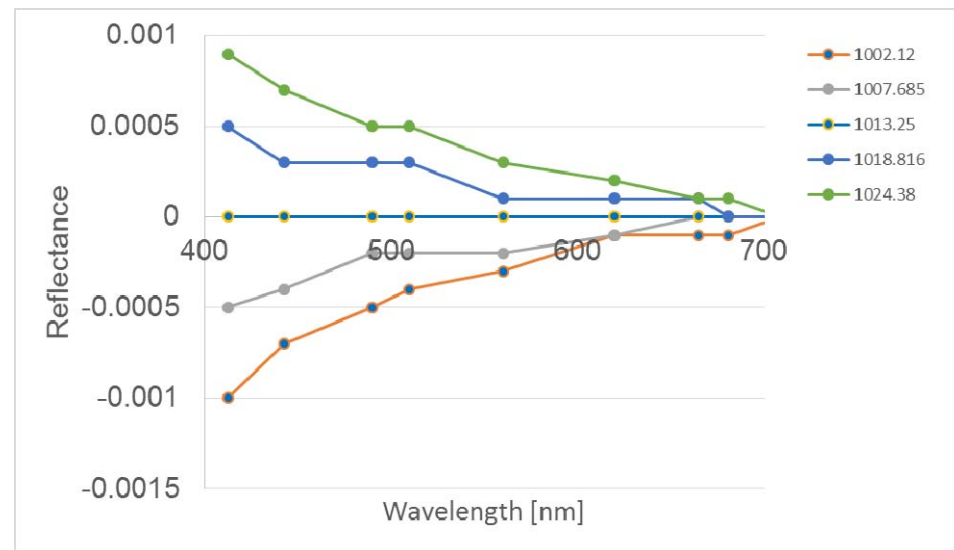Plymouth University

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Ocean Sciences, Feb 2014

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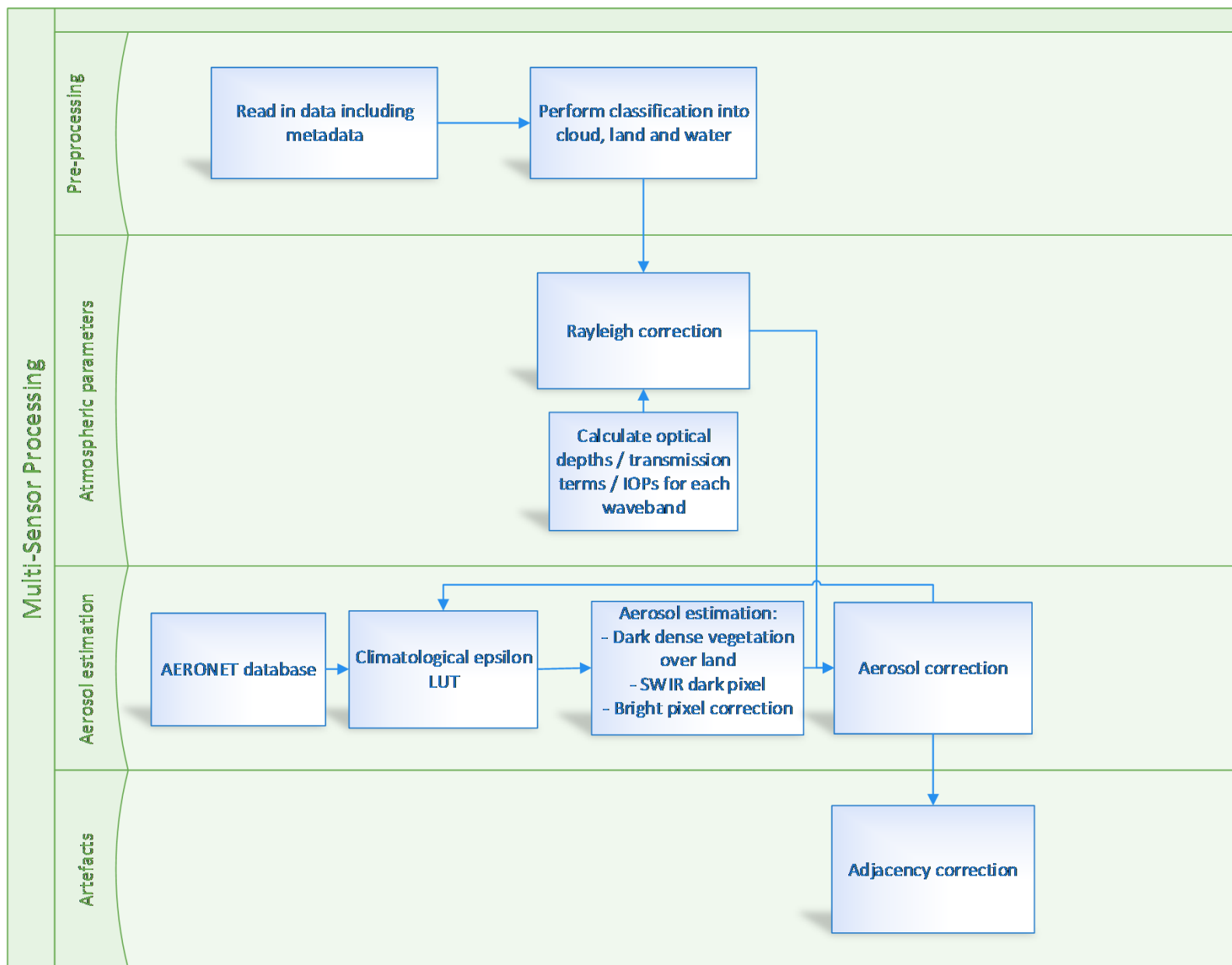# Atmospheric Correction – Simplistic approach

$$R_{toa} = R_w * T_d + R_v$$

Atmospheric contribution:

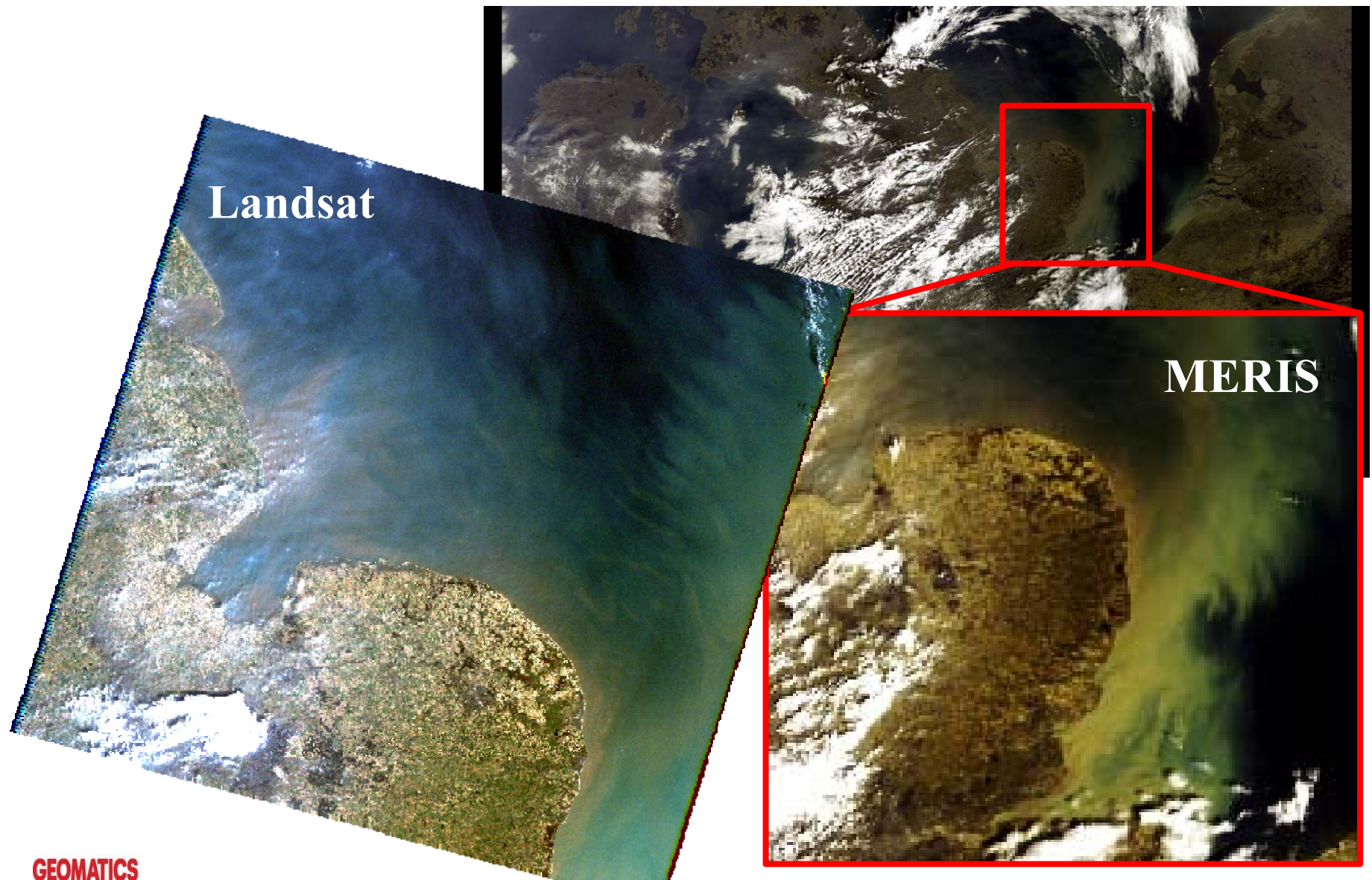$$R_v = \cancel{R}_r + R_a + R_{error}$$

- Background atmospheric correction based on Lavender and Nagur (2002)
- Single scattering aerosol correction using the angstrom exponent for aerosol extrapolation i.e. 'CZCS type' approach

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Multi-Sensor Processing

Pre-processing

- Read in data including metadata
- Perform classification into cloud, land and water

Atmospheric parameters

- Rayleigh correction
- Calculate optical depths / transmission terms / IOPs for each waveband

Aerosol estimation

- AERONET database
- Climatological epsilon LUT
- Aerosol estimation:
  - Dark dense vegetation over land
  - SWIR dark pixel
  - Bright pixel correction
- Aerosol correction

Artefacts

- Adjacency correction

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Atmospheric Correction – Input data
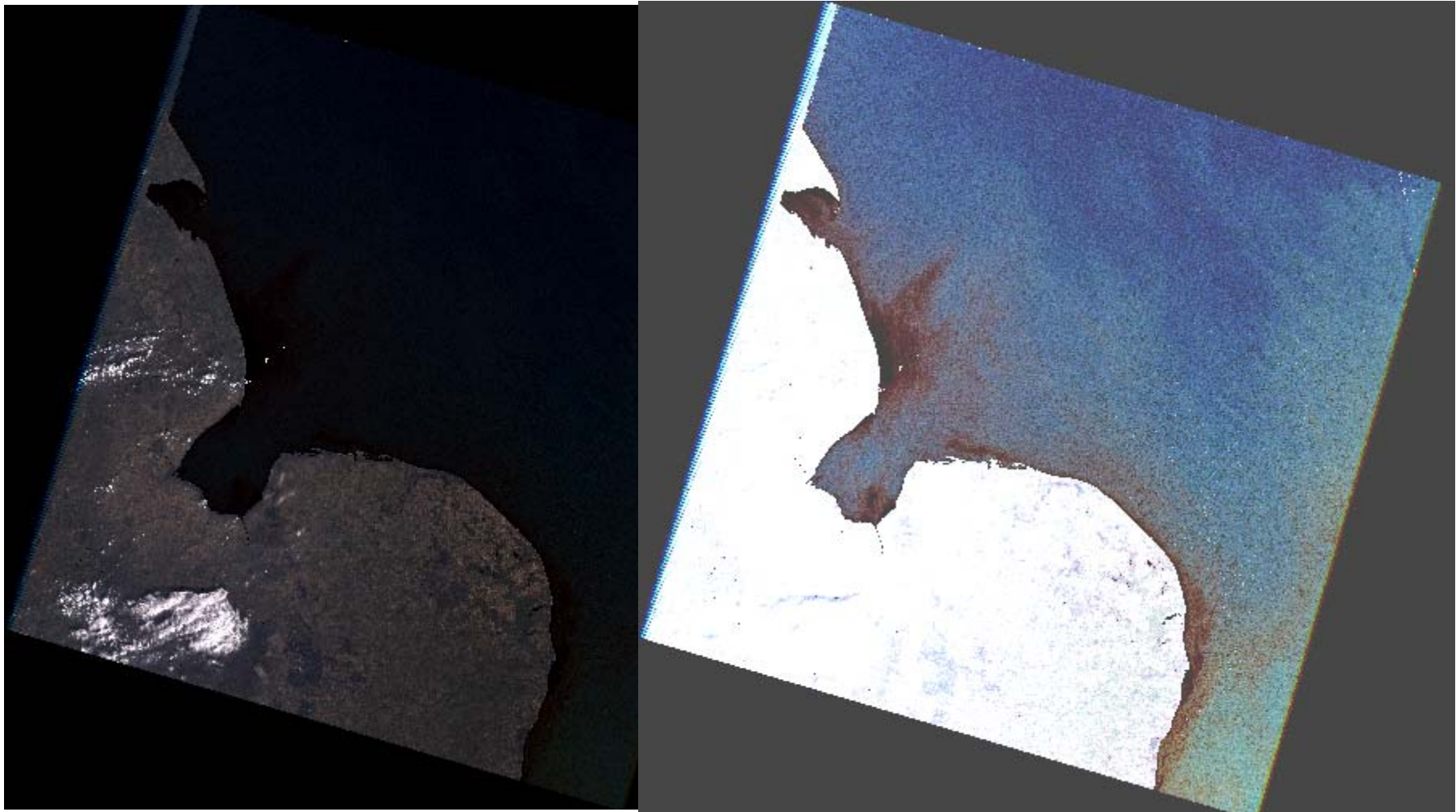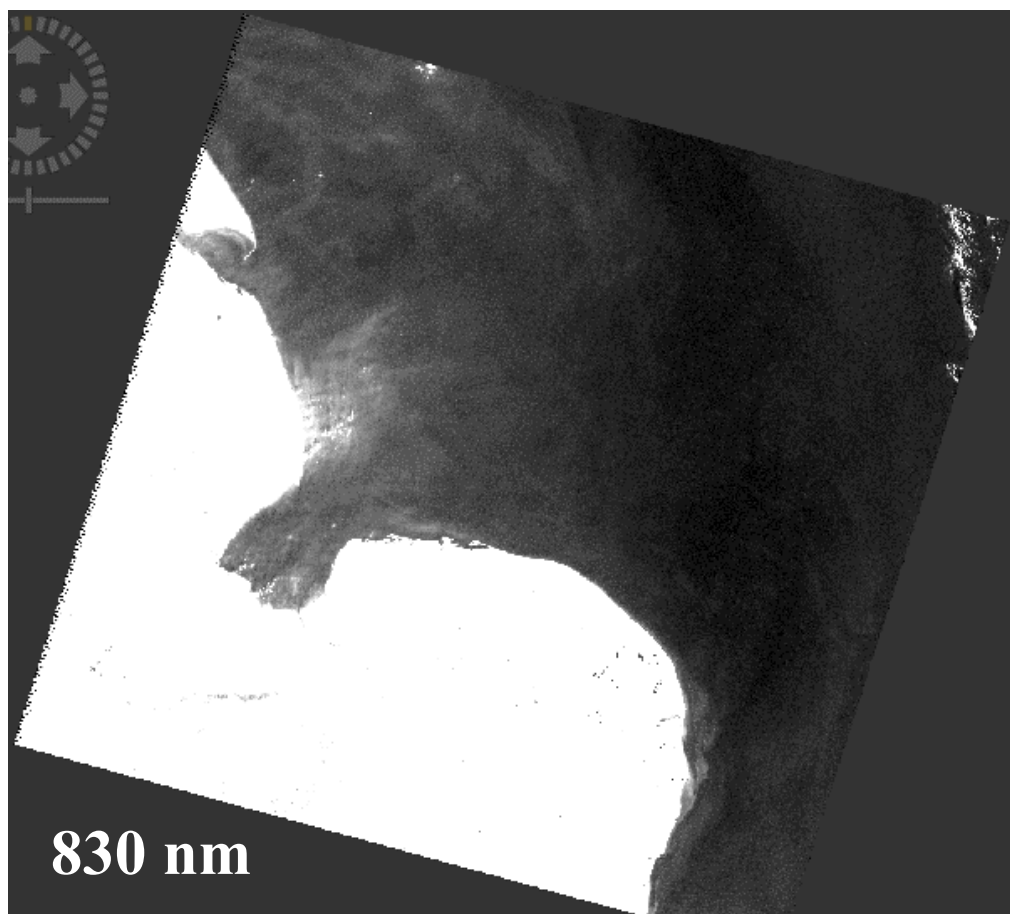
- MERIS: 14, 22, 24, 25 and 30 March 2003

- MODIS-Aqua: 22, 23, 24, 26 and 31 March 2003

- MODIS-Terra: 22, 23, 24, 26, 28, 30 and 31 March 2003

- SeaWiFS: 22, 23, 24 and 30 March 2003

- Landsat ETM+: 24 March 2003

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Landsat

MERIS

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830 nm

1670 nm

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Conclusions

- Approach:
  - Creation of linked modules that allow multiple sensors to be processed
  - Running simplistic model in parallel with more complex plugins to understand what the complexity / each approach is contributing
  - Use aerosol information from previously processed imagery and external sources to aid in the aerosol correction

- Remotely sensed data is more than pixels – the patterns also provide additional information

- Initial results are promising, but the key is understanding the detail…

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